1. In **350 words or less**, please describe the type of company and internship work assignment you would prefer and why?

The host companies are as interdisciplinary as the commercial space industry itself, from additive manufacturing in a microgravity environment to satellite imagery with a 3-5 meter per pixel resolution. I see my experience and passion oriented most with those in rocket propulsion, vehicle integration, and spacecraft design. Each host company serves a purpose of progressing human development in space, but host companies such as Virgin Orbit, Rocket Lab, and The Spaceship Company will always climb to the top of my list. As an intern, my focus would be to learn and assist those around me, I would be there to get hands on with engineers and technicians alike. Opening space is not a one-man venture, the whole is greater than the sum of its parts, and I will be there for the team.

For the past three years I have acted as the Vice President of my university’s rocketry team (University of New Hampshire Students for the Exploration and Development of Space). Joining a few weeks after its foundation by previous Matthew Fellow Charlie Nitschelm, this rocketry team means the world to me.

Over the summer of 2019, I had the opportunity to visit Charlie Nitschelm during his internship at Rocket Lab USA. What he initially told us was going to be a relaxed weekend in California, turned out to be a whirlwind trip visiting and touring different host companies. When all was said and done, we had visited The Spaceship Company in Mojave and Virgin Orbit, Spin launch, and Rocket Lab in Long Beach. That without a doubt, was the best day of my life so far.

I have had the pleasure of knowing exactly what I want to do with my life since I was young. If I am granted a spot in the Matthew Isakowitz Fellowship Program, I will bring the love for space I have carried for the past 10 years and will carry for the rest of my life. The work done by NASA in the Space Race encouraged me to take my first steps, I want to be a part of the team that encourages others to take theirs.

1. Please answer **ONE** of the following essay questions in **350 words or less**:
   * What will be the next giant leap in space technology from the private sector and why?
   * You are testifying before Congress for a hearing focused on the biggest barriers for the commercial space industry. What would be your opening remarks?
   * Elon Musk, in a discussion with our 2019 Fellows, stated that starting a company is like “eating glass and staring into the abyss.” Thankfully, you have the stomach for this kind of business. What start-up idea would drive you into starting a business and why?

Thank you chairwomen Kendra Horn and ranking member Brian Babin, thank you for the opportunity to testify today. As we sit here today, there are more than 21,000 objects larger than 10 cm orbiting the Earth, not to mention the 500,000 bits of space debris that fall between 1 and 10 cm. On the bright side, small debris burns up once it re-enters through the atmosphere, and larger objects can be tracked, simulated and ground impacts predicted. The key term was predicted, not controlled, not modified, simply predicted. As you can see, space debris poses a threat for the space industry on both fronts, in the sky and on land. Competitive entrepreneurship within the commercial space industry has dramatically lowered launching costs, from $54,500 per kilo on the Space Shuttle to $2,720 on the Falcon 9. With this decrease in price, we will see an increase in the number of items launched into orbit. Thus, it is crucial that we recognize commercial space’s responsibility for these items.

In a recent industry study, I asked 15 commercial space professionals what the biggest barriers in the industry were currently, and in the foreseeable future. Of the responses, 8 mentioned space debris and orbital debris disposal as one of their top issues. These professionals are ingrained in our industry, from a Manager of Business Development at one of the largest defense contractors, to a CEO & System Engineer at a Korean based small orbital launch company. Their input is invaluable and as one professional commented on space debris, “It’s like driving across a vast desert with your eyes closed, maximum car speed, with a lot of other cars driving there too… only seeing a very small fraction of things you can run into.” These dangers exist in every facet of space, from life support systems on the ISS, to precision equipment on space satellites. Space debris poses as one of the most formidable dangers for future space missions and will be a significant barrier for the future commercial space industry. Thank you, and I look forward to answering your questions.

1. In **800 words or less,** please answer the following: Why are you excited and passionate about commercial space and your current or future role in it, and why are you a strong candidate for this Fellowship?

         In August 2015 I started my undergraduate’s degree in Engineering Physics from the University of Maine (UMaine). The University had advertised itself as specializing in engineering while the University of New Hampshire (UNH) emphasized business. After three semesters, that was distinctly not true. The school’s facilities were aging, and I had failed to get actively engaged within the academic community. I compared my development to that of my brother, who was soon graduating from UNH with a fulltime job and multiple internships under his belt. I did not see myself achieving the same while at UMaine and realized I needed a change, transferring to UNH was my solution. Once at UNH, I spent no time lost, joining extracurricular organizations and activities. I found my home with UNH Students for the Exploration and Development of Space (SEDS) just a few weeks after its foundation and reconnected with Charlie Nitschelm, future 2019 Fellow and an old acquaintance from middle school.

         UNH SEDS stems from SEDS, a nationwide organization whose mission is to that empowers young people to participate and make an impact in space exploration. UNH SEDS has allowed me to pursue the commercial space industry all while reinforcing the concepts covered in my engineering courses. Although a select instance, sitting in Classical Mechanics my Professor begins class with “Today we’ll be reviewing Tsiolkovsky’s rocket equation.” The following 50 minutes were the best class I have ever attended, and since then many freshmen have received a premature dose of Classical Mechanics and the famous rocket equation. Instances like these are what I try to foster at UNH SEDS, an environment where regardless of your grade or major, there is something exciting to learn about the world above. It has been my pleasure to be the Vice President for the past three years, working with freshmen to seniors, this is my team and I’ll always be there for them.

         UNH SEDS’s development was critical to UNH, it previously lacked an engineering competition team that incorporated all degrees and years. UNH SEDS allowed for knowledge transfer between years to be seamless, and to build a relationship between undergraduates and alumni. During the 2017-2018 school year, mastery of rocketry was a far-fetched reality, from lawn darts to lake landings, we failed in some glorious ways. Time and time again, we marched out to our home-made launchpad and completed 9 flights. I’ll always remember when Charlie and I stayed in the workshop (shop) until 3 AM, finalizing our second rocket, only for it to undergo a rapid unscheduled assembly during flight. It never felt like work. This year captured the spirit of the club at its finest, a few college kids from New Hampshire trying to build rockets. Lessons learned and modifications made we felt strong in our understanding and looked forward. 2018-2019 brought in the development of Runaway, our hybrid engine utilizing HTPB Rubber and Nitrous Oxide. Stepping outside of our comfort zone, we challenged ourselves by attempting four hot-fire tests, gaining insight on our engine’s performance and the capabilities it would be able to achieve the following year. 2019-2020 marks my senior year and with less than 10 months till the 2020 Spaceport America Competition its now or never for New Hampshire’s first undergraduate Hybrid Rocket.

         I grew as the organization grew, I loved and cared for our mission and the work we put in each day. Six months from now I’ll be joining a new team within the commercial space industry, where the same mission exists as before, to inspire the next generation of space loving enthusiast while improving life on and off earth. I can only hope that I have opened space for one of the undergraduates who will be filling in my footsteps.

         Commercial space capitalizes on man’s innate desire to explore. It captures the minds of the youngest generation and the greatest engineering minds alike, inspiring entrepreneurs to drive the market faster and further than the government's reach. When considering its sphere of influence, it’s nearly impossible to determine as commercial space it is ever expanding. Personally, nothing could generate a more fulfilling life’s work than to work with a team of people who are driven by the challenges before them. In conclusion, I believe I am a strong candidate for this program because I share the same drive for exploration that Matthew Isakowitz exhibited. Matthew was an inspirational figure within the commercial space industry and his curiosity was only matched by his kindness. It would be an honor to be part of his legacy.